Final Project Report
On
NAG5-8351

"The application of Jason-Measurements to Estimate the Global Near surface Ocean Circulation for Climate Research"

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Scientific Objectives

The scientific objective of this research program were to utilize drifter and satellite sea level data for the determination of time mean and time variable surface currents of the global ocean. To accomplish these tasks has required the processing of drifter data to include a wide variety of different configurations of drifters into a uniform format and to process the along track satellite altimeter data for computing the geostrophic current components normal to the track. These tasks were accomplished, which resulted in an increase of drifter data by about 40% and the development of new algorithms for obtaining satellite derived geostrophic velocity data that was consistent with the drifter observations of geostrophic time-variable currents. The methodologies and the research results using these methodologies were reported in the publications that are listed below.

Summary of Research Results

• The North Atlantic 10 year time mean surface circulation and its changes due to the NAO were determined.

• The Kuroshio Current system dynamical balances for the 1992-2002 time mean circulation were used to estimate the absolute sea level of the western Pacific.

• High spatial resolution circulation patterns and Lagrangian space and time scales were developed for the Caribbean Sea and the Luzon Strait inflow to the South China Sea and the Eastern Subtropical Pacific.

• Global absolute sea level distribution and unbiased time mean global surface currents were computed and their uncertainties relative to other estimates were documented. These data have been made available on autonomous ftp to over two-dozen investigators and international data centers on a gratis basis.

Publications sponsored under NAG5-8351

1. Niiler, P. and N. Barth: The annual mean surface circulation in the Eastern Pacific. *Oceanography of the Eastern Pacific*, **1**: 1-7 (7 pp.). (2000)

2. Niiler, P.: The world ocean surface circulation. *The Journal of Marine Education*, 16(1): 11-17 (7 pp.). (2000)

3. Niiler, P. P.: The world ocean surface circulation In *Ocean Circulation and Climate*, edited by G. Siedler, J. Church and J. Gould, Academic Press, pp. 193-204 (2001)

4. Orvik, K.A. and P. Niiler: Major pathways of Atlantic water in the northern North Atlantic and Nordic Seas toward Arctic. Geophysical Res. Let., **29**, NO. 19, 1896, doi:10.1029/2002GL015002, (2002).

5. Niiler, P.: Global ocean circulation observations. *Observing the Oceans in the 21st Century,* edited by C.J. Koblinsky and N.R. Smith, GODAE Project Office and Bureau of Meteorology, Melbourne, 1-17 (17 pp.). (2002)

6. Flatau, M.K., L. Talley and P.P. Niiler: The North Atlantic Oscillation, surface current velocities and SST changes in the sub-polar North Atlantic. *J. Climate*, 2355-2369 (2003).

7. Centurioni, L.R., P.P. Niiler: On the surface currents of the Caribbean Sea. *Geophysical Research Letters* **30**(6): 1279-1282. (2003)

8. Niiler, P. P., N. A. Maximenko, and J. C. McWilliams, Dynamically balanced absolute sea level of the global ocean. *Geophys. Res. Lett.*, **30**, 22, 2164, 10.1029/2003GL018628, (2003).

9. Niiler, P.P., N.A. Maximenko, G.G. Panteleev, T. Yamagata, D.B. Olson: Near-surface dynamical structure of the Kuroshio Extension. *Journal of Geophysical Research-Oceans* **108**(C6): 3193-3211. (2003)

10. Reverdin, G., P.P. Niiler, H. Valdimarsson: North Atlantic Ocean surface currents. *Journal of Geophysical Research-Oceans* **108**(C1): 3002-3004. (2003)

11. Centurioni, L.R., P.P. Niiler and D.-K. Lee: Observations of inflow of the Philippine Sea surface water into the South China Sea through the Luzon Strait. *J. Phys. Oceanogr.* **34**, 113-121 (2004)

12. Pazan, S. E. and P.P. Niiler: New global drifter data set available. EOS, 85 (2), 17. (2004)

13. Centurioni, L.R., Niiler, P.P., Lee, D.K: Observations of inflow of Philippine Sea surface water into the South China Sea through the Luzon Strait. *Journal of Physical Oceanography* 34(1): 113-121. (2004)

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Enclosed for your records is the Final Project Report for **NAG5-8351**, "The Application of Jason-1 Measurements to Estimate the Global near Surface Ocean Circulation for Climate Research," Peter Niiler, Principal Investigator.

Copies have also been forwarded to Sheila D. Dezio, Grants Negotiator, and Chester Koblinsky, NASA Technical Officer as well as the ONR Closeout Team.

If you need anything additional please call the undersigned at (858) 534-1293.

Thank you.

Sincerely,

Marian E. Crosser

Marian E. Crosser
Contract & Grant Officer